

## **REMARKS**

Claims 1-3, 5-7, 9-16, 19-67, 69 and 70 are pending in the application and have been rejected.

### **Amendments**

Claim 1 has been amended to recite that the at least one pH-lowering agent is applied in an amount sufficient to lower the pH of at least a portion of said meat below its pH level at grading and to lighten the color from the grading color. Support for this amendment is located at paragraphs [001] and [040].

Claims 34 and 50 have been amended require that both the pH is lowered and the color of the meat is lightened from the grading color. Support for this amendment is located at paragraphs [001] and [040].

### **Claim Rejections 35 USC § 103**

Claims 1-3, 5, 6, 9-25, 27, 34-39, 40-43, 50-52, 53-57 and 67-70 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Calkins et al. (U.S. Patent Application Publication No. 2002/0054941, pages 1-5) in view of Paterson et al. (U.S. Patent Application Publication No. 2003/0180439).

As discussed in the background section of the present application, carcasses presenting muscles that are dark in appearance are commonly referred to in the art as "dark-cutting," "dark-cutters," or "dark, firm, and dry (DFD)." Dark-cutting carcasses yield meat that commands a substantially lower price than meat from non-dark-cutting carcasses because consumers identify the appearance of muscles from dark-cutting carcasses as unappealing and unwholesome, even though palatability characteristics and wholesomeness of meat from dark cutting carcasses is not different from meat derived from carcasses presenting a normal red color.

Dark-cutting meat occurs as a result of stressors on the animal, such as management practices, weather, feeding, illness or transportation, that result in depleted muscle glycogen levels before slaughter. When such stress occurs, muscles lack the glycogen quantities necessary to reduce the pH of muscles to normal postmortem levels

(pH -5.5 to 5.8) and have high final pH's (>6.2). A solution that has been proposed in the prior art, such as in Patterson et al., is to elevate the pH of the meat by application of a pH increasing component like sodium bicarbonate, either before or after rigor mortis.

The present claims are drawn to a meat product, comprising a meat obtained from a dark-cutting carcass having a grading pH; and, an amount of at least one pH-lowering agent sufficient to lower the pH of at least a portion of said meat below its pH level at grading, wherein the meat has been contacted with the at least one pH-lowering agent after onset of rigor mortis. The claims additionally are drawn to a method for treating meat from a dark-cutting carcass.

Calkins et al. describe treatment of a pre-rigor meat with citric acid or a salt thereof to enhance tenderness of the meat. Calkins et al. is only concerned with tenderness, and has nothing to do with whether a meat is from a dark-cutting carcass. The treatment composition of Calkins et al. is applied before rigor mortis (prior to the time of determining the grading pH), and therefore cannot lower the grading pH of at least a portion of the meat. As acknowledged in the Office Action, Calkins et al. do not disclose treatment after onset of rigor mortis. Indeed, Calkins et al. repeatedly emphasizes the need to apply the citric acid or salt thereof to the meat pre-rigor.

Patterson et al. is cited for the purpose of showing that application of a pH increasing agent to meat to elevate the pH of the meat may be carried out either before or after rigor mortis. However, it has already been noted that the recognized treatment for dark cutting meat is to increase the pH of the meat, and not to decrease the pH of the meat by treatment with a pH lowering agent.

It is respectfully submitted that the skilled artisan would have had strong disincentives to combine Calkins et al. with Patterson et al. in the treatment of dark cutting meat as proposed in the Office Action. First, as noted above, Calkins et al. repeatedly emphasizes the need to apply the citric acid or salt thereof to the meat pre-rigor and to act against this express instruction of the reference is manifestly improper. Secondly, one would have expected that adding a pH lowering agent to post-rigor dark cutting meat would merely exasperate the problem of darkness, and would not have

resulted in an improvement in the color of the meat. Thus, the present invention as a whole, which includes as an express element of the present product claims that the dark cutting meat has been treated to lighten the color from the grading color, is not obvious from the prior art.

Additionally, Calkins et al. provides description that shows that the difference in timing of treatment of the meat in Calkins et al. results in generation of a product that is actually different from the product presently claimed. Calkins et al. disclose at paragraph [0009] that it is their strategy “to increase pH while preserving desirable color” (emphasis added). The timing of the administration of the acid in Calkins et al. was stated to reduce the pH decline normally observed in meat. This provides a final product meat that has a higher final pH as compared to a control wherein acid was not administered. See paragraphs [0063] and [0069]. The result was stated to provide a more tender muscle, “without detriment to lean color.” See paragraph [0069]. In fact, the experimental results reported in Calkins et al. show that two of the three muscles were “slightly, but significantly darker than controls.” Paragraph [0131], emphasis added. The observed color effect is thus the opposite of what occurs in the present method, which results in a final product that is lighter in color than controls. Therefore, the timing of addition of acid to meat before or after rigor is not merely an equivalent choice of processing order. Rather, the presently claimed final product is surprisingly different in fact from the product disclosed in Calkins et al.

Reconsideration and withdrawal of this rejection is therefore respectfully requested.

Claims 7, 26, 28, 33, 48, 49, 65 and 66 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Calkins et al. in view of Paterson et al. (U.S. Patent Application Publication No. 2003/0180439) and Komarik (U.S. Patent No. 3,526,521, Abstract and cols. 2-3).

Komarik is cited for its teaching regarding the use of GDL and sodium erythorbate in the process of curing whole meats, and it is asserted that the skilled artisan would have used these chemicals in the treatment method of Calkins et al. in view of Paterson et al.

It is respectfully submitted that the combination of these references does not render the present claims obvious. Specifically, the rejected claims are drawn to a meat product, comprising a meat obtained from a dark-cutting carcass having a grading pH; and, an amount of at least one pH-lowering agent sufficient to lower the pH of at least a portion of said meat and to lighten the color from the grading color, and also to a method for treating meat from a dark-cutting carcass by contacting the meat with at least one pH-lowering agent sufficient to lower the pH and to lighten the color from the grading color of at least a portion of said meat.

As noted above, the object of Calkins is to treat pre-rigor meat to enhance tenderness of the meat, and Calkins does not contemplate treatment of post-rigor or dark dark-cutting carcasses at all. The skilled artisan would have had a strong disincentive to change the Calkins treatment to a post-rigor treatment of dark cutting meat in view of the teaching that the pH of dark cutting meat is already too low. Also as noted above, the skilled artisan would have had strong disincentives to combine Calkins et al. with Patterson et al. in the treatment of dark cutting meat as proposed in the Office Action. Thus, even if combined, the references would have taught the skilled artisan a product and a method whereby pre-rigor treatment is required to achieve the desired object of the primary reference. The present post-rigor treatment therefore cannot be said to be obvious in view of these references in combination.

Claims 29-32 and 45-47 and 62-64 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Calkins et al. in view of Paterson et al. (U.S. Patent Application Publication No. 2003/0180439) and Nakao et al. (U.S. Patent No. 3,666,488, cols. 2-3).

Nakao is cited for its teaching regarding use of phosphate buffers.

More specifically, Nakao teaches stabilizing the meat color developed in meat products by the treatment with nitrates or nitrites by contacting the meat with a weakly acid aqueous solution having a specified pH and acid content. See claim 1. The use of phosphate buffer systems is mentioned at the top of column 3. Nakao therefore provides discussion about stabilizing an existing color, but provides no teaching or suggestion about treating a dark-cutting meat to lighten the color of the meat after it has been graded.

Even if the chemical selections of Nakao were used in the process of Calkins as asserted in the Office Action, such a combination would not result in a product or method as presently claimed. As noted above, the object of Calkins is to treat pre-rigor meat to enhance tenderness of the meat, and Calkins does not contemplate treatment of post-rigor or dark-cutting carcasses at all. Also as noted above, the skilled artisan would have had strong disincentives to combine Calkins et al. with Patterson et al. in the treatment of dark cutting meat as proposed in the Office Action. Thus, even if combined, the references would have taught the skilled artisan a product and a method whereby pre-rigor treatment is required to achieve the desired object of the primary reference. The present post-rigor treatment therefore cannot be said to be obvious in view of these references in combination.

Claims 44 and 61 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Calkins et al. in view of Paternson et al. (U.S. Patent Application Publication No. 2003/0180439) and Tracy et al. (U.S. Patent No. 4,576,825, cols. 2-3) or Holdren et al. (U.S. Patent No. 5,736,186, col. 6).

Tracy and Holdren are cited in the above rejection for their teaching of use of encapsulated materials in curing meats. It is noted that these references provide no teaching or suggestion about treating a dark-cutting meat to lighten the color of the meat after it has been graded.

Even if the chemical selections of Tracy and/or Holdren were used in the process of Calkins as asserted in the Office Action, such a combination would not result in a product or method as presently claimed. As noted above, the object of Calkins is to treat pre-rigor meat to enhance tenderness of the meat, and Calkins does not contemplate treatment of post-rigor or dark dark-cutting carcasses at all. Also as noted above, the skilled artisan would have had strong disincentives to combine Calkins et al. with Patterson et al. in the treatment of dark cutting meat as proposed in the Office Action. Thus, even if combined, the references would have taught the skilled artisan a product and a method whereby pre-rigor treatment is required to achieve the desired object of the primary reference. The present post-rigor treatment therefore cannot be said to be obvious in view of these references in combination.

**Conclusion**

In view of the above remarks and amendments, it is respectfully submitted that the foregoing is fully responsive to the outstanding Office Action. Early favorable consideration of the above application is earnestly solicited. In the event that a phone conference between the Examiner and the Applicant's undersigned attorney would help resolve any issues in the application, the Examiner is invited to contact said attorney at (651) 275-9811.

Respectfully Submitted,

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